

## IN THE SPECIFICATION

Please make the following changes to the specification:

[0045] A Bayes Net is a graphical representation of a joint probability distribution decomposition (~~cite Koller or somebody else~~). Creation and computation of Bayes Nets are at the core of the software and other techniques and thus very fast implementation on many Bayes Net operations have been developed

[0057] ADTrees are the Ram DATABASE main cache. ADTrees are a caching structure used to store a database in a way that allows for queries of the type “how many records match a certain pattern”. In a basic form, the general concept is in the public domain (~~cite Andrew Moore at CMU~~); the AD Trees of the present invention provide:

[0058] Bayes Nets cannot have cycles in them (e.g. the probability of A given B given C given A). Many other data structures also require that they not contain cycles. Typical methods of determining cyclicity require checking every node in the graph. In the present invention, methods are able to avoid this and limit testing to a small subset of nodes. The result is that this test is significantly faster in our implementation than the brute force approaches. The present invention extends the well known coloring cycle detection algorithm (~~cite the “Algorithms” book~~) substantially by providing functionality for efficient detection of cycles when arrows (“adds”) are successively added or deleted from the graph.

[0061] The present invention uses several structural search algorithms, among which:

- Expansion search (~~see other document~~)
- Two pass greedy with dynamic arc evaluation and initial random shuffling.

[0071] The inference engine of the present invention is based in the concept of Join Tree (~~cite Shenoy, of whomever~~). In one embodiment, implementation presents significant improvements over the basic concept that significantly increase the speed and scalability. Some of these are: